DOCUMENT RESUME

ED 402 120 RC 020 780

AUTHOR Mathews, Jerry G.; And Others
TITLE Assessment of Teacher Technology Needs in Fifty-Five Southeastern Idaho School Districts.
PUB DATE Oct 96
NOTE 42p.; Paper presented at the Annual Meeting of the National Rural Education Association (San Antonio, TX, October 11-14, 1996).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Computer Attitudes; *Computer Literacy; *Computer Uses in Education; Educational Technology; Elementary Secondary Education; Higher Education; Needs Assessment; Questionnaires; *Rural Schools; Self Evaluation (Individuals); Sex Differences; *Teacher Attitudes; Teacher Characteristics; Teacher Education
IDENTIFIERS *Computer Use; *Idaho (Southeast); Teacher Surveys

ABSTRACT

A survey of teachers from 55, primarily rural, school districts in southeastern Idaho examined teachers' perceptions of their own ability to use educational technology and their actual technology use. In addition, the study examined the effects of gender, education level, years of teaching, grade level assignment, number of subjects taught, number of students taught per day, and number of computers in the classroom. Of 6,000 surveys mailed, 3,500 were returned. Between one-third to one-half of respondents never used technology for instructional purposes and more than one-half of respondents rated themselves as novices in the use of technology and in computer literacy. Survey results also revealed that the educational level of respondents and the number of computers in the classroom were the best predictors of teachers' actual use of technology. More frequent use of technology was reported by recently hired teachers with Bachelor's degrees and by teachers who had a higher number of computers in their classrooms. In addition, education level and gender were the best predictors of teachers' perceived ability to use technology. Again, the lower the education level of the teacher, the higher the perceived ability of the teacher to use technology. Also, males tended to perceive themselves as having a higher ability to use technology than did females. No significant differences were found between teachers' actual use of technology and their perceptions of their ability to use technology. Includes data tables and survey questionnaire. Contains 13 references. (LP)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 402 120

ASSESSMENT OF TEACHER TECHNOLOGY NEEDS IN FIFTY-FIVE SOUTHEASTERN IDAHO SCHOOL DISTRICTS

PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Jerry G. Mathews

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Jerry G. Mathews
Educational Administration
Idaho State University

E. E. "Gene" Davis
Educational Administration
Idaho State University

George H. Hamilton
Graduate Assistant
Idaho State University

Paper Presented at the Annual Meetings of the National Rural Education Association

San Antonio, Texas
October 11-14, 1996

BEST COPY AVAILABLE

RC020780

Assessment of Teacher Technology Needs in Fifty-five Southeastern Idaho School Districts

A Teacher Technology Survey Questionnaire was administered in November 1995 to 55 school districts of approximately 6000 teachers in southeastern Idaho. The survey was administered by the Office of Professional Development for Schools, College of Education, at Idaho State University. Ten demographic variables describing the school setting and 15 variables relating to the use of technology in instruction and communications were included in the survey. The 15 variables were used to determine teachers' perceptions of their actual use of technology and their ability to use technology.

From the results of the data analysis, it was determined that there was no difference between teachers' actual use of technology and the perception of their ability to use technology in selected items. Multiple linear regression analysis indicated that several of the demographic variables were statistically significant predictors of teachers' actual use of technology and their perception of ability to use technology.

Introduction

Rural schools in Idaho began moving rapidly into the world of technology with the provision of ten million dollars by the Idaho Legislature in 1995. Prior to this time, each school district was responsible for funding technology from other sources. The legislature plans to continue to appropriate ten million dollars annually for implementation of technology in Idaho schools.

Critical to the implementation of any major initiative, particularly technology, is the preparation of teachers. Fifty-five school districts in Southeast Idaho, including 36 districts in two partnerships with Idaho State University College of Education, requested assistance with a technology needs assessment. The Office of Professional Development for Schools (OPDS) in the College of Education works with the school districts on a regular basis; therefore, OPDS assumed the responsibility for the first phase of implementation.

In the Fall of 1995, school district superintendents requested a technology staff development needs assessment conducted to determine the level of knowledge and use of technology by classroom teachers. The Teacher Technology Survey Questionnaire (See Appendix A) was developed based on the Teacher Technology Assessment Instrument developed at the University of Maryland.

The purpose of this study was to determine the best predictors of Southeastern Idaho teachers' perception of their

ability to use technology and their **actual use of technology** in the classroom. It is our hope that the information gathered from this study will provide administrators and educators in Southeast Idaho with data to determine future staff development and training needs based on selected demographic variables that describe the population of teachers in their school districts.

Research Questions

Research Question 1. How do teachers perceive themselves regarding their **actual use of technology** and their **ability to use technology**?

Research Question 2. What are the best predictors of teachers' perceptions of their **actual use of technology** related to (a) preparing instructional materials for classroom use, (b) grade recording and calculation, (c) attendance, (d) tutorials to explain concepts/methods, (e) drill and practice, (f) word processing, and (g) the Internet?

Research Question 3. What are the best predictors of teachers' perceptions of their **ability to use technology** related to (a) preparing instructional materials for classroom use, (b) grade recording and calculation, (c) attendance, (d) tutorials to explain concepts/methods, (e) drill and practice, (f) word processing, and (g) the Internet?

The independent (predictor) variables for research questions 2 and 3 were as follows: (a) gender, (b) educational level of the respondent, (c) total years of teaching experience, (d) grade

level presently teaching, (e) number of subject preparations presently teaching, (f) number of students taught per day, and (g) the number of computers in the teacher's classroom.

Technology in education is on the list of priorities in school organizations nationwide, but it may be a more critical issue in certain regions of the country. In a survey of school priorities conducted by Northwest Regional Laboratory for Research and Development (Northwest Report, 1995) it was reported that educational technology is one of the top six issues in schools. This area of education has received enough attention for the U.S. department of Education to introduce the Office of Educational Technology. The office is currently implementing a long-range plan for the use of technology in education (Roberts, 1996).

Home Use of Technology

Software Publishers Association (CD-ROM software) conducted a study of home sales of educational software and discovered that these sales increased 136% during the first half of 1995. The study revealed that nearly one half of American homes had a computer and that 17% of those without a computer planned to buy one during 1996 (Heller Report, 1996, cited in "CDROM software," 1996). It was also found that public libraries are beginning to offer network access as well as computers and software to the general public. This also makes the availability of technology more accessible to students outside of the classroom.

Students and Technology

Networking is one of the fastest growing areas of technology. In 1994-95 29% of elementary schools, 39% of middle/junior high schools, and 51% of high schools had computers with modems to access the Internet (QED, 1995B). According to the Regional Laboratory for Educational Improvement of the Northeast & Islands, "Computer networks can minimize isolation; develop stronger links to the community; access reference information from remote sources; and create professional and academic exchanges for teachers, administrators, and students." (1995, p. 8)

Computers have become increasingly important potential tools for students and educators alike. "Virtually every student in a formal education setting has access to a computer" (Plotnick, 1995, p. 2). Hayes and Bybee (1995) found that the student/computer ratio was 12:1 in 1995 compared to 22:1 in 1988-89.

Teachers and Technology

With the increase in numbers of computers, the availability of technology has greatly increased. Computer laboratories and library media centers tend to be the central locations of these computers. Quality Education Data (1995A) found that instructional technology specialists, special education teachers, and curriculum supervisors were most likely to have computers in school districts. In his study, Monk (1989) has noted that computer technology has become a familiar part of education and teachers

are utilizing computers in various programs in and out of their classrooms. However, the lack of technology training and staff development for teachers is seen as a problem area for implementation of technology in education.

Across the nation, the need for technology planning has become an integral part of restructured school programs (Plotnick, 1995). The National Educational Goals Report (1995) stated that only half of all teachers reported any professional development opportunities available to them in the areas of technology. In a survey of approximately 2000 teachers in Southeastern Idaho it was found that 1586 of the teachers surveyed showed an interest in attending a technology workshop during a Fall, 1996, inservice training conference. In Idaho, with its majority of schools in remote, rural areas, the need for technology planning, teacher training and staff development is a critical issue.

Methods

Population and Instrumentation

The population in this study consisted of approximately 6000 teachers in 55 Southeastern Idaho school districts. These 55 school districts contain primarily small, rural schools in farming communities. The percentage of ethnic groups in the 55 districts includes the following: (a) 94.5% white, (b) 3.5% Hispanic, (c) 1.5% Native American, and (d) .5% blacks. Data for the study was obtained from a 40-item Teacher Technology Survey Questionnaire

(See Appendix A). The surveys were mailed to all the schools in the 55 school districts. The school principals were instructed to administer the surveys and mail them back to the Office of Professional Development for Schools for analysis. Approximately 3500 useable surveys were returned.

The first 10 questions were demographic variables, most of which served as predictor variables in the analysis. Seven Likert scale items selected from Part II of the survey were the dependent variables used to determine classroom teachers' perceptions of their **actual use of technology**. The same set of items, indicated in Part III of the survey, was used to determine teachers' perceptions of their **ability to use technology**.

For each of the items indicating **actual use of technology**, the scale was (a) never, (b) rarely, (c) frequently, and (d) always. For each of the items indicating **ability to use technology**, the scale was: (a) novice, (b) intermediate, and (c) advanced. The questionnaire to assess Idaho teachers' **actual use** and **ability to use** technology was, in part, developed from the University of Maryland's Teacher Technology Assessment Instrument. The instrument was used by permission. The reliability coefficient for the Teacher Technology Survey Questionnaire was .91.

Procedures

For research question 1, the percentage of teachers who responded to Likert scale items in Part II and Part III was calculated. The calculations indicated the percentage of teachers'

perceptions of their **actual use of technology** with the following scale: (a) never, (b) rarely, (c) frequently, or (d)always. In addition, the calculations indicated the percentage of teachers who perceived their **ability to use technology** with the following scale: (a) novice, (b) intermediate, or (c) advanced. The Likert items used in Part II and Part III of the Teacher Technology Survey Questionnaire were: (a) preparing instructional materials for classroom use, (b) grade recording and calculation, (c) attendance, (d) tutorials to explain concepts/methods, (e) drill and practice, (f) word processing, and (g) the Internet.

Stepwise multiple linear regression analyses were used for research questions 2 and 3 to determine which demographic variables presented in the Teacher Technology Survey Questionnaire and accounted for a statistically significant amount of variation in the dependent variables. All regression analyses were performed using the stepwise method of selecting the predictor variables in this section of the analysis.

The regression analysis estimates the coefficients of a linear equation involving the independent variables that best predicts the value of the dependent variable. Multiple regression determines the relative importance of each independent variable on the accreditation outcome measure used in the analysis. One way to determine or assess the relative importance of independent variables in the regression equation is to consider the increase in the R^2 value when a variable is entered into the regression

equation that already contains the other independent variables (Pedhauzer, 1982). The R^2 increase can be calculated by subtracting the previous R^2 reported at each step from the R^2 in subsequent steps. The equation used in this analysis was

$$R^2_{change} = R^2 - R^2_{(i)}$$

where $R^2_{(i)}$ is the R^2 value when all independent variables except the ith variable were in the equation.

Research Question 1. How do teachers perceive their **actual use of technology** and their **ability to use technology**?

Procedure: Calculations were performed of the percentages of teachers' responses to their actual use of technology and their ability to use technology.

Research Question 2. What are the best predictors of teachers' perceptions of their actual use of technology related to (a) preparing instructional materials for classroom use, (b) grade recording and calculation, (c) attendance, (d) tutorials to explain concepts/methods, (e) drill and practice, (f) word processing, and (g) the Internet?

Procedure: Stepwise Multiple Linear Regression analyses were used to determine which of the independent variables presented in the Teacher Technology Survey Questionnaire were the best predictors of teachers' perceptions of their actual use of technology. This procedure used demographic variables in the Teacher Technology Survey Questionnaire as **independent**

(predictor) variables and teachers' perceptions of their actual use of technology as **dependent** variables. Hair, Anderson, Tatham, & Black (1992) have stated that regression analysis is the appropriate statistical analytical procedure to use when the research goal is to measure the proportion of the variation in the dependent variable that can be explained by variations in the independent variables (predictors of the variance). The authors further noted that regression analysis provides four separate functions: (a) predicting the model (b) determining the statistical significance of the model, (c) determining the appropriateness of the predictive model, and (d) examining the strength of the association between variables. The use of regression analysis to address this research question allowed the researcher to determine if the demographic variables presented in the Teacher Technology Survey Questionnaire were significant predictors of teachers' perceptions of their **actual use of technology**. One or more percent of variation associated with a predictor variable was considered significant.

Research Question 3. What are the best predictors of teachers' perceptions of their **ability to use technology** related to (a) preparing instructional materials for classroom use, (b) grade recording and calculation, (c) attendance, (d) tutorials to explain concepts/methods, (e) drill and practice, (f) word processing, and (g) the Internet?

Procedure: Stepwise Multiple Linear Regression analyses were used to determine which of the independent variables presented in

the Teacher Technology Survey Questionnaire were the best predictors of teachers' perceptions of their ability to use technology. This procedure used demographic variables in the Teacher Technology Survey Questionnaire as **independent (predictor)** variables and teachers' perceptions of their ability to use technology as **dependent** variables.

Results

Teachers' Perceptions of Their Actual Use of Technology

This section contains the calculations of the percentages of teachers' responses to their actual use of technology and their ability to use technology. Also included is the regression analysis which involved seven demographic variables: (a) gender, (b) educational level of the respondent, (c) total years of teaching experience, (d) grade level presently teaching, (e) number of subject preparations presently teaching, (f) number of students taught per day, and (g) the number of computers in the teacher's classroom. In this study, separate multiple regression analyses were conducted using the teachers' perception variables as separate dependent variables. These variables, contained in Part II of the survey, were as follows: (a) preparing instructional materials for classroom use, (b) grade recording and calculation, (c) attendance, (d) tutorials to explain concepts/methods, (e) drill and practice, (f) word processing, and (g) the Internet.

Percentages of Teachers' Responses

Table 1 is a summary of the percentage of teachers who resounded to the Likert scale items in Part II and Part III of the Teacher Technology Survey Questionnaire. In this section are the results of the analysis for research question 1 regarding teachers' perceptions of their actual use of technology.

Table 1

Percentage of Teachers' Perceptions of Their Actual Use of Technology

Item	Percent	
	Never	Always
Preparation of instructional materials	28.9	8.0
Grade recording and calculation	28.5	23.5
Attendance	54.7	25.3
Tutorials	42.1	4.4
Drill and practice.	38.8	7.4
Word Processing	26.9	19.6
Internet	79.1	2.8

Note. The scale for rarely and frequently was not included in the data for brevity.

Predictors of Teachers' Perceptions of Their **Actual Use of Technology**

Preparation of instructional materials as the dependent variable. This multiple regression analysis was performed to determine which predictor variables accounted for a statistically significant amount of the variation in teachers' ability to use

technology in preparation of instructional materials (dependent variable).

Table 2

Stepwise Multiple Regression of R^2 and R^2_{change} for Predictors of Teachers' Perceptions of Their Actual Use of Technology in Preparation of Instructional Materials

Predictor Variable and Step	R^2	R^2 change
1. Education level	.192	.192
2. Number of computers in class .	.202	.010
3. Years experience	.208	.006
4. Students taught per day	.212	.003
5. Gender	.213	.001

After the first step of the multiple regression analysis, the R^2 value was .192. This indicated that 19.2% of the variation in Teachers' perceptions of their actual use of technology in preparation of instructional materials was attributed to by variations in the education level of the teachers responding to that item. After the second step of the regression procedure, the R^2 value increased to .202. This indicated that the number of computers in the classroom accounted for a change in the R^2 value of .010, or 1.0% of the variation in Teachers' perceptions of their actual use of technology in preparation of instructional materials was accounted for by variations in the number of computers in the classroom. Table 2 summarizes this regression analysis.

BEST COPY AVAILABLE

The measure of the relative importance of the indicator variables within the regression equation is signified by the Beta coefficients and the direction of the relationships are signified by the *t*-values. Negative *t*-values indicate that the value of the dependent variable decreases as the value of the predictor variable increases. The result of the analysis indicated that 46.1% of the total variation in dependent variable was explained by five of the indicators, $F(5,3410) = 184.3$, $p = .000$: (a) education level, (b) years of teaching experience, (c) gender, (d) number of computers in the classroom, and (e) number of students taught per day. These values are also presented in Table 3. All subsequent regression summary tables reflect this procedure.

Table 3

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Actual Use of Technology in Preparation of Instructional Materials

Variables in the Equation			
Variable	Beta	t	prob.
Education level	-.197	-17.976	.000*
Years teaching experience	.066	5.682	.000*
Gender	-.060	-2.000	.046*
Number computer in class	.085	6.963	.000*
Students taught per day	.034	3.389	.001*

*$F(5,3410) = 184.293$, $p = .000$

*$p < .05$

Grade recording and calculation as the dependent variable.

Table 4

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Actual Use of Technology in Grade Recording and Calculation

Predictor Variable and Step	R^2	R^2 change
1. Students taught per day	.022	.022
2. Number of computers in class .	.038	.016
3. Education level	.043	.005
4. Gender	.045	.001

Table 5

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Actual Use of Technology in Grade Recording and Calculation

Variables in the Equation			
Variable	Beta	t	prob.
Education level	-.075	-3.900	.000*
Gender	-.043	-2.500	.013*
Number computers in class	.146	7.733	.000*
Students taught per day	.202	10.486	.000*

*$F(5,3408) = 40.074$, $p = .000$

*$p < .05$

The result of the analysis indicated that 21.2% of the total variation in the dependent variable was explained by four of the predictor variables, $F(5,3408) = 40.074$, $p = .000$.

Attendance as the dependent variable.

Table 6

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Actual Use of Technology in Attendance

Predictor Variable and Step	R^2	R^2 change
1. Education level	.059	.059
2. Number of computers in class .	.084	.025
3. Students taught per day	.105	.021
4. Gender	.113	.008

Table 7

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Perceptions of Their Actual Use of Technology in Attendance

Variables in the Equation			
Variable	Beta	t	prob.
Education level	.147	.7.890	.000*
Gender	-.091	-5.461	.000*
Number computers in class	.193	10.586	.000*
Students taught per day	.144	12.458	.000*

*$F(4,3406) = 108.177$, $p = .000$

*$p < .05$

The result of the analysis indicated that 33.6% of the total variation in the dependent variable was explained by four of the predictor variables, $F(4,3406) = 108.177$, $p = .000$.

Tutorials as the dependent variable.

Table 8

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Actual Use of Technology in Tutorials

Predictor Variable and Step	R^2	R^2 change
1. Number of computers in class .	.017	.017
2. Grade level	.024	.006
3. Number subject preparations . .	.025	.001

Table 9

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Perceptions of Their Actual Use of Technology in Tutorials

Variables in the Equation			
Variable	Beta	t	prob.
Grade level	-.064	-3.424	.001*
Number computers in class	.128	7.205	.000*
Number subject preparations . . .	.039	2.057	.040*

*$F(4,3406) = 108.177$, $p = .000$

*$p < .05$

The result of the analysis indicated that 15.7% of the total variation in the dependent variable was explained by three of the predictor variables, $F(4,3406) = 108.177$, $p = .000$.

Drill and practice as the dependent variable.

Table 10

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Actual Use of Technology in Drill and Practice

Predictor Variable and Step	R^2	R^2 change
1. Number of students taught . . .	.046	.046
2. Grade level	.053	.007
3. Number subject preparations . .	.056	.003
4. Gender	.058	.002
5. Years experience	.060	.001
6. Number of computers in class .	.061	.002

Table 11

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Perceptions of Their Actual Use of Technology in Drill and Practice

Variables in the Equation			
Variable	Beta	t	prob.
Years experience	.056	2.924	.004*
Gender	.052	2.992	.003*
Grade level	-.081	-4.038	.000*
Number computers in class	.045	2.392	.017*
Number students taught.	-.113	-5.049	.000*
Number subject preparations . . .	.051	2.339	.019*

*$F(6,3409) = 36.924$, $p = .000$

*$p < .05$

The result of the analysis indicated that 24.7% of the total variation in the dependent variable was explained by six of the predictor variables, $F(6,3409) = 36.924$, $p = .000$.

Word processing as the dependent variable.

Table 12

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Actual Use of Technology in Word Processing

Predictor Variable and Step	R^2	R^2 change
1. Education level	.108	.108
2. Grade level	.115	.007
3. Years experience	.117	.002
4. Gender	.118	.001

Table 13

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Perceptions of Their Actual Use of Technology in Word Processing

Variables in the Equation			
Variable	Beta	t	prob.
Education level	-.395	-13.597	.000*
Experience	.070	3.082	.002*
Gender	.038	2.328	.020*
Grade level	.010	5.456	.000*

*F(4,3408) = 114.520, p = .000

*p < .05

The result of the analysis indicated that 34.4% of the total variation in the dependent variable was explained by four of the predictor variables, F(4,3408) = 114.520, p = .000.

Internet as the dependent variable.

Table 14

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Actual Use of Technology in Internet

Predictor Variable and Step	R^2	R^2 change
1. Number of computers in class .	.014	.014
2. Number students taught	.024	.011
3. Grade level	.027	.003

Table 15

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Perceptions of Their Actual Use of Technology in Internet

Variables in the Equation			
Variable	Beta	t	prob.
Grade level	.063	2.465	.014*
Number computers in class	.129	5.918	.000*
Number students taught . . .	.070	2.721	.006*

*$F(3,2123) = 19.652$, $p = .000$

*$p < .05$

The result of the analysis indicated that 16.4% of the total variation in the dependent variable was explained by three of the predictor variables, $F(3,2123) = 19.652$, $p = .000$.

Teachers' Perceptions of Their Ability to Use Technology

Percentages of teachers' responses. Table 16 is a summary of the percentage of teachers who responded to the Likert scale items in Part II and Part III of the Teacher Technology Survey Questionnaire. This section includes the results of the analysis for research question 1 regarding teachers' ability to use technology.

Table 16

Percentage of Teachers' Perceptions of Their Ability to Use Technology

Item	Percent	
	Novice	Advanced
Preparation of instructional materials	59.2	12.6
Grade recording and calculation	42.8	20.0
Attendance	55.6	17.5
Tutorials	58.4	9.4
Drill and practice.	50.4	12.9
Word Processing	53.2	16.0
Internet	77.4	4.8

Note. The scale for intermediate was not included for brevity.

Preparation of instructional materials as the dependent variable.

Table 17

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Ability to Use Technology in Preparation of Instructional Materials

Predictor Variable and Step	R^2	R^2 change
1. Education level	.148	.148
2. Grade level	.157	.008
3. Number of computers in class	.161	.005
4. Years experience	.165	.004
5. Number subject preparations	.169	.004
6. Gender	.171	.002

Table 18

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Perceptions of Their Ability to Use Technology in Preparation of Instructional Materials

Variables in the Equation			
Variable	Beta	t	prob.
Education level	-.395	-16.382	.000*
Years experience	.104	4.674	.000*
Gender	-.048	-2.946	.003*
Grade level	.074	3.984	.000*
Number computers in class	.088	4.994	.000*
Number subject preparations . . .	-.075	-3.938	.000*

*$F(5,3377) = 38.410$, $p = .000$

*$p < .05$

The result of the analysis indicated that 41.4% of the total variation in the dependent variable was explained by five of the predictor variables, $F(5,3377) = 38.410$, $p = .000$.

Grade recording and calculation as the dependent variable.

Table 19

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Ability to Use Technology in Grade Recording and Calculation

Predictor Variable and Step	R^2	R^2 change
1. Gender	.028	.028
2. Number of students taught . . .	.035	.007
3. Number of computers in class .	.046	.011
4. Education level	.052	.006
5. Grade level	.054	.002

Table 20

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Perceptions of Their Ability to Use Technology in Grade Recording and Calculation

Variables in the Equation			
Variable	Beta	t	prob.
Education level	-.105	-5.221	.000*
Gender	-.121	-6.920	.000*
Grade level	.049	2.377	.018*
Number computers in class	.136	7.201	.000*
Number students taught.	.132	6.311	.000*

*$F(5,3377) = 38.410$, $p = .000$

*$p < .05$

The result of the analysis indicated that 23.2% of the total variation in the dependent variable was explained by five of the predictor variables, $F(5,3377) = 38.410$, $p = .000$.

Attendance as the dependent variable.

Table 21

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Ability to Use Technology in Attendance

Predictor Variable and Step	R^2	R^2 change
1. Number of computers in class .	.039	.039
2. Gender	.066	.027
3. Number of students taught . . .	.084	.017
4. Educational level	.090	.006
5. Grade level	.092	.003
6. Years experience	.093	.001
7. Education level	.093	-.006

Table 22

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Perceptions of Their Ability to Use Technology in Attendance

Variables in the Equation			
Variable	Beta	t	prob.
Years experience	-.073	-3.969	.000*
Gender	-.146	-8.565	.000*
Grade level	.071	3.661	.000*
Number computers in class	.170	9.394	.000*
Number students taught.	.073	3.556	.000*

*$F(5,3380) = 69.367$, $p = .000$

*$p < .05$

The result of the analysis indicated that 30.5% of the total variation in the dependent variable was explained by five of the predictor variables, $F(5,3380) = 69.367$, $p = .000$.

Tutorials as the dependent variable.

Table 23

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Ability to Use Technology in Tutorials

Predictor Variable and Step	R^2	R^2 change
1. Number of computers in class .	.010	.010
2. Gender	.016	.006
3. Grade level	.022	.006

Table 24

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Perceptions of Their Ability to Use Technology in Tutorials

Variables in the Equation			
Variable	Beta	t	prob.
Gender	-.090	-5.156	.000*
Grade level	-.080	-4.662	.000*
Number computers in class	.192	5.353	.000*

*$F(3,3390) = 25.477$, $p = .000$

*$p < .05$

The result of the analysis indicated that 14.8 of the total variation in the dependent variable was explained by three of the predictor variables, $F(3,3390) = 25.477$, $p = .000$.

Drill and Practice as the dependent variable.

Table 25

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Ability to Use Technology in Drill and Practice

Predictor Variable and Step	R^2	R^2 change
1. Educational level	.018	.018
2. Number of computers in class .	.026	.009
3. Grade level	.031	.005
4. Number of students taught . . .	.032	.001
5. Gender	.033	.002

Table 26

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Perceptions of Their Ability to Use Technology in Drill and Practice

Variables in the Equation			
Variable	Beta	t	prob.
Educational level	-.103	-5.005	.000*
Gender	-.041	-2.334	.020*
Grade level	-.063	-3.046	.002*
Number computers in class	.070	3.632	.000*
Number students taught.	-.051	-2.436	.015*

*$F(5,3386) = 23.400$, $p = .000$

*$p < .05$

The result of the analysis indicated that 18.3% of the total variation in the dependent variable was explained by five of the predictor variables, $F(5,3386) = 23.400$, $p = .000$.

Word Processing as the dependent variable.

Table 27

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Ability to Use Technology in Word Processing

Predictor Variable and Step	R^2	R^2 change
1. Education level	.089	.089
2. Gender	.093	.005
3. Grade level	.095	.002

Table 28

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Perceptions of Their Ability to Use Technology in Word Processing

Variables in the Equation			
Variable	Beta	t	prob.
Education level	-.318	-17.349	.000*
Gender	-.063	-3.777	.000*
Grade level	.052	2.801	.005*

*F(3,3387) = 118.454, p = .000

*p < .05

The result of the analysis indicated that 30.8% of the total variation in the dependent variable was explained by three of the predictor variables, F(3,3387) = 118.454, p = .000.

Internet as the dependent variable.

Table 29

Stepwise Multiple Regression of R^2 and R^2 change for Predictors of Teachers' Perceptions of Their Ability to Use Technology in Internet

Predictor Variable and Step	R^2	R^2 change
1. Education level	.027	.027
2. Gender	.045	.017
3. Number computer in class.	.051	.006

Table 30

Stepwise Multiple Regression Analysis for Variables Predicting Teachers' Perceptions of Their Ability to Use Technology in Internet

Variables in the Equation			
Variable	Beta	*t*	prob.
Education level	.147	8.502	.000*
Gender	-.118	-6.951	.000*
Number computers in class	.082	4.649	.000*

*$F(3,3388) = 60.527$, $p = .000$

*$p < .05$

The result of the analysis indicated that 22.6% of the total variation in the dependent variable was explained by three of the predictor variables, $F(3,3388) = 60.527$, $p = .000$.

Discussion

Research Question 1. How do teachers perceive their actual use of technology and their ability to use technology? The overall pattern of the data indicated approximately one-third to one-half of the teachers never **actually used technology** for any instructional purposes (See Table 1). The lack of use of technology for tutorials and drill and practice may be explained by the lack of adequate numbers of computers in the classrooms. The average number of computers in the classroom was three for all school districts. More than 70% of the teachers never used the Internet in the classroom.

The overall pattern of the data regarding the teachers' **ability to use technology** indicated that more than one-half

perceived themselves as novices in the use of technology in all of the items in Part III of the survey (See Table 16). In addition, the survey asked teachers to rate themselves in computer literacy as either novice, intermediate, or advanced. Overall, teachers rated themselves as novices in computer literacy. Thus, it appears that, in Southeastern Idaho school districts, training and staff development are needed to enhance the teachers' actual use of technology and ability to use technology.

Research Question 2. What are the best predictors of teachers' perceptions of their actual use of technology related to (a) preparing instructional materials for classroom use, (b) grade recording and calculation, (c) attendance, (d) tutorials to explain concepts/methods, (e) drill and practice, (f) word processing, and (g) the Internet? The overall pattern of the data indicated that the **education level** of the teacher was the best predictor of the teachers' actual use of technology in preparation of instructional material, attendance reporting, and word processing (See Table 31). Overall, more frequent use of technology was indicated by teachers with a Bachelor's degree (lower education level). Approximately one-third of the teachers reported their teaching experience as less than one year while one-third reported their teaching experience as more than 10 years. Eighty percent of the teachers reported a Bachelor's degree as their education level. Thus, recently hired teachers with Bachelor's degrees may be

better trained in technology and have higher computer literacy than the veteran teachers.

The number of computers in the classroom was the overall second best predictor of teachers' actual use of technology. The higher the number of computers in the classroom, the more frequently teachers used technology. This data indicates that the funds spent for hardware pay off in dividends of technology use by teachers.

Table 31

Ranking of Predictors of Teachers' Perception of Their Actual Use of Technology

Rank	Q10	Q11	Q12	Q14	Q15	Q17
1	Ed. Lev. (-)	St. Tau.	Ed. Lev.	No. Com.	No. St. (-)	Ed. Lev. (-)
2	No.Com.	No. Com.	No. Com.	Gr. Lev. (-)	Gr. Lev. (-)	Gr. Lev.
3	Yr. Exp.	Ed. Lev	St. Tau.	No. Sub.	No. Sub.	Yr. Exp.
4	St. Tau.	Gender (-)	Gender (-)		Gender	Gender
5	Gender (-)				Yr. Exp.	
6					No. Com.	

Note. [a](Q10)preparing instructional materials for classroom use, (Q11) grade recording and calculation, (Q12) attendance, (Q14) tutorials to explain concepts/methods, (Q15) drill and practice, (Q17) word processing, and (Q20) the Internet. [b] (-)represents a negative relationship between the predictor variable and the dependent variable.

BEST COPY AVAILABLE

Research Question 3. What are the best predictors of teachers' perceptions of their ability to use technology related to (a) preparing instructional materials for classroom use, (b) grade recording and calculation, (c) attendance, (d) tutorials to explain concepts/methods, (e) drill and practice, (f) word processing, and (g) the Internet? As we expected, the predominant predictor of the teacher's **ability to use technology** was the education level of the teacher (See Table 32). Overall, the data indicated that education level was the best predictor of teachers' perceptions of their ability to use technology in four of the dependent variables: (a) preparation of instructional materials, (b) drill and practice, (c) word processing, and (d) use of the Internet. Again, the lower the education level of the teacher, the higher the perceived ability of the teacher to use technology.

The second best predictor of the teachers' perception of their ability to use technology was gender. It was indicated as either the first or second best predictor in six of the seven items selected as dependent variables. In this study, males tended to perceive themselves as having high ability in the use of technology compared to females.

Table 32

Ranking of Predictors of Teachers' Perception of Their Ability to Use Technology

Rank	Q25	Q26	Q27	Q29	Q30	Q32	
	Ed. Lev. (-)	Gender (-)	No. Com.	No. Com.	Ed. Lev. (-)	Ed. Lev. (-)	Ed
	Gr. Lev.	No. St.	Gender (-)	Gender (-)	No. Com.	Gender (-)	Ge (-
	No. Com.	No. Com.	St. Tau.	Gr. Lev. (-)	Gr. Lev. (-)	Gr. Lev.	No
	Yr. Exp.	Ed. Lev. (-)	Gr. Lev.		No. St. (-)		
	No. Sub. (-)	Gr. Lev.	Yr. Exp. (-)		Gender (-)		
	Gender (-)						

Note. [a](Q25)preparing instructional materials for classroom use, (Q26) grade recording and calculation, (Q27) attendance, (Q29) tutorials to explain concepts/methods, (Q30) drill and practice, (Q32) word processing, and (Q35) the Internet. [b] (-)represents a negative relationship between the predictor variable and the dependent variable.

BEST COPY AVAILABLE

Our conclusion is that administrators in Southeast Idaho can use this information to assess technology needs for their teachers. The data tends to indicate that there is a need for staff development and training based on the responses of teachers to the items in the Teacher Technology Survey Questionnaire. Hiring recent graduates of teacher education programs may assure administrators that school districts will have teachers who have the ability to use technology in the classrooms. Also, administrators can compare the demographic characteristics of teachers in their school districts to the findings regarding teacher demographic variables in this study and make decisions about the greatest need in planning for technology.

References

"CD-ROM Software Sales Soar." Edupage. Internet WWW page, at URL: http://www.utopia.com/mailings/edupage.4.January.1996.html (1996, January 4).

Hair, J. F., Anderson, R. E., Tatham, R. L., Black, W. C. (1992). Multivariate data Analysis. (3rd ed.). New York: McMillan.

Hayes, J. & Bybee, D.L. (1995, October). Defining the greatest need for educational technology. Learning and leading with technology. 23(2), 48-53.

Means, B. And Others. (1993). Using technology to support educational reform. Washington, DC: U.S. Government Printing Office. (Eric Document Reproduction Service No. ED 364 220)

Monk, D. (1989). Using technology to improve the curriculum of small rural schools.(Eric Document Reproduction Service No. ED 308 056)

The National Education Goals Report. (1995). Washington, DC: U.S. Government Printing Office.

Northwest Regional Educational Laboratory. (1995, Summer). Northwest Report.

Pedhauzur, E. J. (1982). Multiple regression in behavioral research (2nd ed.). Fort Worth, TX: Holt, Rinehart, and Winston, Inc.

Plotnick E. (1995). Trends in educational technology 1995. (Eric Document Reproduction Service No. EDO-IR-96-08)

Quality Education Data. (1995a). Technology trends in U.S. public schools. Internet WWW page, at URL: http://www.edshow.com/QED/

Quality Education Data. (1995b). Education market guide and mailing list catalog 1995-1996. Denver: Author

Regional Laboratory for Educational Improvement of the Northeast & Islands. (1994, Summer). On-line learning technologies: Networking in the classroom. Rural, small schools networking, Information Exchange No. 16, Summer 1994. (Eric Document Reproduction Service No. ED 383 484)

Roberts, L. (1996). A transformation of learning: Use of the national information infrastructure for education and lifelong learning. Educational Media and Technology Yearbook 1995-96. Englewood, CO: Libraries Unlimited. (Eric Document Reproduction Service No. ED 391 474)

APPENDIX A

Teacher Technology Survey Questionnaire

Office of Professional Development For Schools
College of Education
Idaho State University
Teacher Technology Survey Questionnaire

School district superintendents in Regions 4, 5, and 6 have requested that the Office of Professional Development For Schools gather information regarding teachers' use of technology and staff development needs for school districts. Your help, as a teacher, is critical to the success of this survey.

This survey packet contains the following: (a) a 40 item Technology Survey Questionnaire (FRONT AND BACK) and (b) a Scantron answer form. Please take a few minutes to respond to the items listed on the Survey Questionnaire. Then, return the entire survey packet to your building administrator for mailing to ISU. Thank you in advance for your assistance.

Identification Number Directions: In the largest rectangle at the **top** of the Scantron answer form, fill in the **three-digit region number code for your school district** in the top three rows of "bubbles". Then write in the corresponding numbers in the top three open spaces to the right. Use the three-digit number **district code** provided by your principal.

PART I. Directions: Respond to each of the following by filling in the bubbles under the appropriate letter on the Scantron answer form corresponding to the item number. Please use a number 2 softlead pencil and carefully fill in **only one** bubble for each item. Do not put any stray marks on the Scantron form as the scanner will read only marks within the bubbles.

1. (a) male (b) female

2. Ethnic background of respondent:
   (a) Native American
   (b) Asian/Pacific Islander
   (c) African American
   (d) Hispanic
   (e) White

3. Educational level of respondent:
   (a) 4 year college degree
   (b) Master's Degree
   (c) Educational Specialist Degree
   (d) Doctoral Degree
   (e) Other

4. Total years of teaching experience:
   (a) Less than one year
   (b) 1-3 years
   (c) 4-5 years
   (d) 6-10 years
   (e) More than 10 years

5. Grade level presently teaching:
   (a) K-3
   (b) 4-6
   (c) 7-8
   (d) 9-12
   (e) Other

6. Number subject preparations taught:
   (a) 1
   (b) 2
   (c) 3
   (d) 4
   (e) More than 4

7. Number of students taught per day:
   (a) less than 30
   (b) 30-59
   (c) 60-89
   (d) 90-119
   (e) 120 or more

8. Number of computers in your classroom:
   (a) 0
   (b) 1-3
   (c) 4-6
   (d) More than 6

9. Your computer literacy self rating:
   (a) Novice
   (b) Intermediate
   (c) Advanced

PART II. Directions: Respond to the following numbered items by filling in the bubbles under the appropriate letter **on the Scantron answer form** corresponding to the item number. Use **only one** response indicating your actual use of technology for each item from the following:

(a) Never (b)Rarely (c) Frequently (d) Always

10.	Preparation of instructional materials	(a)	(b)	(c)	(d)
11.	Grade recording and calculation	(a)	(b)	(c)	(d)
12.	Attendance	(a)	(b)	(c)	(d)
13.	Graphics and drawing	(a)	(b)	(c)	(d)
14.	Tutorials to explain concepts/methods	(a)	(b)	(c)	(d)
15.	Drill and practice	(a)	(b)	(c)	(d)
16.	Discovery learning/problem solving	(a)	(b)	(c)	(d)
17.	Word processing	(a)	(b)	(c)	(d)
18.	Simulations	(a)	(b)	(c)	(d)
19.	Database searching and research	(a)	(b)	(c)	(d)
20.	Internet	(a)	(b)	(c)	(d)
21.	CD-ROM for multimedia	(a)	(b)	(c)	(d)
22.	Modem for telecommunications	(a)	(b)	(c)	(d)
23.	Distance learning	(a)	(b)	(c)	(d)
24.	Large screen monitor	(a)	(b)	(c)	(d)

PART III. Directions: Respond to the following numbered items by filling in the bubbles under the appropriate letter **on the Scantron answer form** corresponding to the item number. Use **only one** response indicating your ability to use technology for each item from the following:

(a) Novice (b) Intermediate (c) Advanced

25.	Preparation of instructional materials	(a)	(b)	(c)
26.	Grade recording and calculation	(a)	(b)	(c)
27.	Attendance	(a)	(b)	(c)
28.	Graphics and drawing	(a)	(b)	(c)
29.	Tutorials to explain concepts/methods	(a)	(b)	(c)
30.	Drill and practice	(a)	(b)	(c)
31.	Discovery learning/problem solving	(a)	(b)	(c)
32.	Word processing	(a)	(b)	(c)
33.	Simulations	(a)	(b)	(c)
34.	Database searching and research	(a)	(b)	(c)
35.	Internet	(a)	(b)	(c)
36.	CD-ROM for multimedia	(a)	(b)	(c)
37.	Modem for telecommunications	(a)	(b)	(c)
38.	Distance learning	(a)	(b)	(c)
39.	Large screen monitor	(a)	(b)	(c)

PART IV. Respond to the following numbered item by filling in the bubbles under the appropriate letter **on the Scantron answer form** corresponding to the item number.

40. Instructional minutes in computer lab per week:
    (a) 0 (c) 31-60
    (b) 0-30 (d) More than 60